

Amendments to the Specification:

Page 1, amend the paragraph beginning on line 17 to read as follows.

In conventional diagnostic ultrasound systems, as described in Japanese Patent No. 3194947 and U.S. Patent No. 5143070, when an examining physician such as a paramedic applies extraneous force to a body surface of a region-of-interest in a subject using a probe, a difference between ultrasonic cross-section images of different frames is produced in order to measure a displacement caused by applying the extraneous force. The conventional arts make it possible to ~~diagnoses~~ diagnosis hardness or softness of each biological tissue in the region-of-interest.

Page 2, amend the paragraph beginning on line 2 to read as follows.

However, the above patent documents merely describe displaying a contour image of distortion and Young's ~~modules~~ modulus values. The conventional diagnostic ultrasound systems cannot cope with the need for time-sequentially acquiring ultrasonic images while varying the pressure applied to a body surface by giving force to a probe, and producing a difference between ultrasonic images so as to visualize the hardness or softness of a biological tissue.

Page 2, amend the paragraph beginning on line 12 to read as follows.

The foregoing drawback is overcome by a diagnostic ultrasound system including: a probe for ultrasonic measurement by bringing said ~~[[the]]~~ probe into contact with a subject in a first state; a first image production means for producing a first image of the subject according to information received from the probe; an image display means for displaying the first image produced by the first image production

means; a means for setting at least one piece of reference information on the first image displayed by the image display means; a second image production means for producing a second image of the subject according to information measured by bringing the probe into contact with the subject in a second state different from the first state; a variation operation means for calculating a change of the reference information, which is set on the first image by the setting means, into a counterpart visualized in the second image; a distortion operation means for calculating distortion information on a desired region-of-interest delineated in the second image according to the change calculated by the variation operation means; and a display control means for controlling the display of distortion information, which is calculated by the distortion operation means, on the image display means.

Page 3, amend the paragraph beginning on line 10 to read as follows.

Moreover, aside from the foregoing hardware configuration, a computer system included in the diagnostic ultrasound system or a general-purpose computer may implement a method of displaying distortion information on a biological tissue observed in an ultrasonic image; the method including a step for time-sequentially storing displacements of a biological tissue in a memory means, a step for time-sequentially reading the displacements from the memory, a step for displaying distortion information on a biological tissue ~~so as to that~~ the relative displacements can be relatively observed.

Page 4, amend the paragraph beginning on line 3 to read as follows.

Fig. 3 shows a schematic drawing for explaining an image after ~~filtered-filtering~~ according to the embodiment;

Page 7, amend the paragraph beginning on line 4 to read as follows.

The frame memory 4 ~~produced~~produces image data by storing the 5 frame information received from the complex cine memory 3 every scanning line according to ultrasonic beam. The frame memory 4 includes an affine transformation circuit which transforms scanning lines according to ultrasonic beam into scanning lines on a TV monitor, an image data memory, and an overlay circuit which displays color information, character string information, and graphic information on the display unit 5 while superposing them on one another.

Page 7, amend the paragraph beginning on line 13 to read as follows.

The display unit 5 ~~display~~displays an image according to a signal outputted from the frame memory 4. The display unit 5 has, for example, a TV monitor which receives a television signal representing a B-mode image (cross-section image) and on which the cross-section image is displayed.

Page 8, amend the paragraph beginning on line 7 to read as follows.

Meanwhile, as shown in Fig. 11B, a post-displacement image based on echo signals is acquired when the macro distance of the region-of-interests which is located at the deepest position, from the probe is the smallest. As shown in Fig. 11B, after the probe 1 is pressed against a subject, the biological tissue and the a plurality of local region-of-interest (ROI#1 and ROI#2) in the biological tissue are, compared with those shown in Fig. 11A, deformed as if to contract. The deformation is attributable to a micro displacement made by a region-of-interest and a macro displacement made by an entire biological body. The micro displacement and macro displacement have a difference indicated in Fig. 12. Fig. 12A shows the micro

displacements made by a region-of-interest with the passage of time before and after pressure is applied to the body surface. Fig. 12B shows the macro displacements made by the biological body with the passage of time before and after pressure is applied to the body surface. In other words, the macro displacement and micro displacement show inherent time-series changes before and after pressure is applied. The feature point sampling unit 6 will be detailed later.

Page 9, amend the paragraph beginning on line 3 to read as follows.

The displacement operation unit 7 compares the feature point and counterpart, which are extracted by the feature point sampling unit 6 before and after deformation, with each other, and calculates a variation of deformation made by a region-of-interest located at the feature point on the basis of the result of the comparison. The displacement operation unit 7 is designed to act according to whether a feature point and its counterpart are detected by the feature point sampling unit 6. The displacement operation unit 7 includes: a means for deforming information stored in the complex cine memory so as to ~~as to~~ that the feature point and counterpart will be agreed with each other; a means for sequentially preserving a variation of movement derived from deformation (a variation of deformation) as a value of a displacement made by the region-of-interest; and a means for sequentially comparing the preserved displacement values with one another so as to calculate maximum and minimum displacement values indicating displacements made by the region-of-interest. Moreover, since only the maximum and minimum displacement values indicating displacements made by the region-of-interest are calculated, an intermediate value of all displacement values indicating displacements made by the region-of-interest or a displacement width by which the region-of-interest is displaced in total may be calculated. The displacement operation unit 7 will be detailed later.

Page 10, amend the paragraph beginning at line 8 to read as follows.

When the feature point and counterpart detected by the feature point sampling unit 6 are represented by mutually different coordinates, that is, the coordinates (positions) representing the feature point and counterpart are different from each other, the displacement operation unit 7 included in the present embodiment acts as described below. First, information read from the complex cine memory 3 is deformed so ~~at to~~ that the feature point and counterpart will ~~be agreed~~ agree with each other. The deformed information and the information that is not deformed are compared with each other in order to calculate a variation of deformation as a displacement value. Furthermore, maximum and minimum displacement values are preserved. An image in which the feature point is seen to have been displaced to a variation indicated with the minimum displacement value is preserved as an initial image, and an image in which the feature point is seen to have been displaced to a variation indicated with the maximum displacement value is preserved as a final image produced after displacement. On the other hand, if the coordinates (positions) of the feature point and counterpart had no difference, or if the counterpart of the feature point ~~was~~ were not found, the displacement operation unit 7 would continue to preserve an initial image and a final image that are stored immediately previously.

Page 14, amend the paragraph beginning at line 9 to read as follows.

The distortion image is, as shown in Fig. 13, displayed in gray-scale in colors while superposed on a cross-section image. A plurality of region-of-interest ROI#1, ROI#2, ROI#3 is delineated as desired region-of-interest by use of the setting unit

30. Namely, the displacement values indicating the variations of displacements made by the designated regions of interest ROI#1, ROI#2, and ROI#3 are displayed as shown in the right lower part of the drawing. Data representing a distortion image (a difference between cross-section images) are produced through arithmetic operations so as to display the numerical values. For example, a known character string generator converts the image data into characters, and the characters are displayed in the cells in a table allocated to ROI#1, ROI#2, and ROI#3. Because the cross-section image and distortion image are measured in real time, an instantaneous value that updates in real time is displayed. Instantaneous values may be sequentially stored in a memory in order to calculate statistics including a cumulative value and an average, and the statistics may be displayed. The statistics including the cumulative value, average, variance, and standard deviation may be calculated according to a known statistical data calculating method. Moreover, the number of statistics displayed may not be one, but a plurality of statistics, for example, the instantaneous value and average may be displayed in combination. Moreover, a macro displacement that is a displacement made by a biological body may also be displayed.

Page 15, amend the paragraph beginning on line 12 to read as follows.

Moreover, instead of the numerical values shown in Fig. 13, or in combination with them, a graph shown in Fig. 14 may be displayed. For display of the graph, data representing a distortion image (a difference between cross-section image data items) is calculated through arithmetic operations, and a known graph generator converts the calculated data into a graph that can be displayed in a desired display area on the display unit. The graph produced is then displayed. Fig. 14A shows the

relationship of displacements based on region-of-interest to the macro displacement based on a biological body. The graph makes it possible to verify at sight which of the region-of-interest exhibit local hardness. For example, in this example, because the displacement based on the region-of-interest ROI#3 is small, it means that a part of the region-of-interest ROI#3 is hard and suspected of being a malignant tumor. Consequently, the graph can provide a doctor with diagnostic information signifying that close examination is needed. Moreover, as shown in Fig. 14B, a bar graph permitting comparison of displacements made by regions of interest may be adopted. Even the bar graph can provide a doctor with diagnostic information similar to the one shown in Fig. 14A. Incidentally, aside from the bar graph, any of various graphs including a line graph, a solid bar graph, and a solid line graph, and a circular graph may be adopted.

Page 17, amend the paragraph beginning on line 3 to read as follows.

Thus, a portion of an image showing different hardness can be displayed while being clearly distinguished from the other portion. Moreover, a distortion image can be produced without the necessity of a special stress application device. ~~Wherein~~ Accordingly, the maximum and minimum displacement values and the distortion image may be displayed together with a cross-section image sent from the complex cine memory 3, that is, a real-time cross-section image. Alternatively, the maximum and minimum displacement values and the distortion image may be displayed after acquisition of cross-section images is completed or responsively to handling of the setting unit 30.

Page 18, amend the paragraph beginning on line 1 to read as follows.

Moreover, because an examining physician need not make a subjective judgment, objective ultrasonic examination can be achieved. Consequently, the time required for examination will become even despite a difference in experience in ultrasonic examination examination time will be shortened.